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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.

10/738,454

Confirmation No. 8855

Applicant

Wittrup et al.

Filed

December 16, 2003

TC/A.U.

1645

Examiner For Not assigned

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YEAST CELL SURFACE DISPLAY

OF PROTEINS AND USES THEREOF

Docket No.

97-99E

Customer No.:

23713

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Commissioner for Patents P.O. Box 1450

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INFORMATION DISCLOSURE STATEMENT

Sir:

This application is a divisional of U. S. Application Serial No. 09/724,108, filed November 28, 2000, U.S. Patent No. 6,696,251. Copies of PTO Forms 1449 submitted in U.S. Application Serial No. 09/724,108 are enclosed. In addition, copies of Notices of References filed in 09/724,108 are included. In accordance with 37 C.F.R. 1.98(d), copies of references cited in that application are not submitted, but will be provided upon request. Copies of references not previously submitted are included. Pursuant to the Waiver published in the Official Gazette on August 5, 2003, because this application was filed after June 30, 2003, copies of cited U. S. patents are not included, but will be provided upon request.

This information is cited in a spirit of forthrightness and cooperation to enable the applicants to obtain that measure of protection for the invention to which there is entitlement. However, no representation is made that the listed art actually qualifies as prior art under the patent statute and the mere use of PTO-1449 is not an admission

that all listed references are prior art. No representation is made that applicants know of the best art.

It is believed that no fee is due with the submission of this Information Disclosure Statement. If this is incorrect, however, please charge the required fee and the fee for any extension of time needed to Deposit Account No. 07-1969.

Respectfully submitted,

Sura K. Doyle

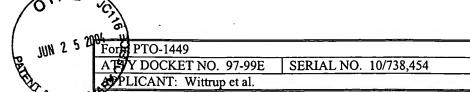
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FILING DATE: December 16, 2003



GROUP: 1645

U.S. PATENT DOCUMENTS

Exmr.	Document					Filing Date if
Initial	Number	Date	Name	Class	Subclass	Appropriate
	5,348,867	9/20/94	Georgiou et al.	435	69.7	
	5,871,907	2/16/99	Winter et al.	436	6	
	6,300,065	10/9/01	Kieke et al.	435	6	
	6,423,538	7/23/02	Wittrup et al.	435	320.1	
	6,696,251	2/24/04	Wittrup et al.	435	6	
	6,699,658	3/2/04	Wittrup et al.	435	6	

FOREIGN PATENT DOCUMENTS

	Document					Translation
	Number	Date	Country	Class	Subclass	Yes/No
	WO 01/48145	7/5/01	WO			
	WO 99/36569	07/22/99	WO			
	EP 00673427	9/27/95	EP			
	EP 00682710	11/22/95	EP			

NON-PATENT LITERATURE DOCUMENTS

Hoogenboom, H.R., "Designing and optimizing library selection strategies for generating high-affinity antibodies," Tibtech 15:62-70, 1997
Kipriyanov, S. M., et al., "Two amino acid mutations in an anti-human CD3 single chain Fv antibody fragment that affect the yield on bacterial secretion but not the affinity," Protein Eng. 10(4):445-453, April 1997
Kowalski, J.M., et al., "Secretion efficiency in Saccharomycescerevisiae of bovine pancreatic trypsin inhibitor mutants lacking disulfide bonds is correlated with thermodynamic stability," Biochemistry 37:1264-1273, February 3, 1998
Marks, J. D. et al., "Molecular evolution of proteins on filamentous phage," J. Biol. Chem. 267(23):16007-16010, 1992
Martineau, P. et al., "Expression of an antibody fragment at high levels in the bacterial cytoplasm," J. Mol. Biol. 3:117-127, 1998
Moosmayer, D. et al., "A single-chain TNF receptor antagonist is an effective inhibitor of TNF mediated cytotoxicity," Therapeutic Immunology 2:31-40, 1995

EXAMINER

DATE CONSIDERED

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

Form PTO 1449		
ATTY DOCKET NO. 97-99E	SERIAL NO. 10/738,454	FILING DATE December 16, 2003
APPLICANT Wittrup et al.		GROUP 1645

U.S. PATENT DOCUMENTS

Exmr Initial		Document Number	Date (dd-mm-yyyy)	Name	Class	Subclass	Filing Date if Appropriate
	1	5,861,156	01/19/1999	George et al.	424	135.1	

FOREIGN PATENT DOCUMENTS

	Document Number	Date	Country.	Class	Subclass	Translation Yes/No
				A,F		

OTHER PRIOR ART (including Author, Title, Date, Pertinent Pages, etc.)

2	Weidanz, Jon A. et al. (August 1998) "Display of functional αβ single-chain T-cell receptor molecules on the surface of bacteriophage" <i>Journal of Immunological Methods</i> 221 :59-76.
3	Shusta, E.V. et al. (1999) "Yeast Polypeptide Fusion Surface Display Levels Predict Thermal Stability and Soluble Secretion Efficiency" <i>Academic Press</i> 292:949-956.
4	Lake, D.F. et al. (January 1999) "Construction and binding analysis of recombinant single-chain TCR derived from tumor-infiltrating lymphocytes and a cytotoxic T lymphocyte clone directed against MAGE-1" International Immunology 11:745-751.
5	Kumar, V. et al. (1997) "Recombinant T Cell Receptor Molecules Can Prevent and Reverse Experimental Autoimmune Encephalomyelitis" <i>The Journal of Immulology</i> 159 :5150-5156.

EXAMINER

DATE CONSIDERED

^{*}EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.



Form PTO-1449		
	SERIAL NO. 10/738,454	FILING DATE December 16, 2003
APPLICANT Wittrup et al.		GROUP 1645

U.S. PATENT DOCUMENTS

Exmr. Initial	Document Number	Date	Name	Class	Subclass	Filing Date if Appropriate
	4,946,778	08/07/90	Ladner et al.	435	69.6	
	- 5,013,650	05/07/91	Carty	435	69.1	
	5,223,409	06/29/93	Ladner et al.	435	69.7	
	5,225,539	07/06/93	Winter			
	5,258,289	11/02/93	Davis		ļ	
	5,258,498	11/02/93	Huston et al.	530	350	<u> </u>
	5,260,203	11/09/93	Ladner et al.	435	172.3	<u> </u>
	5,316,922	05/31/94	Brown			
	5,403,484	04/04/95	Ladner et al.	435	235.1	
	5,411,873	05/02/95	Adams			
	5,427,908	06/27/95	Dower			
	5,482,858	01/09/96	Huston et al.	435	252.33	ļ
	5,510,240	04/23/96	Lam ·			
	5,571,698	11/05/96	Ladner			<u> </u>
	5,580,717	01/20/95	Dower			
	5,624,817	04/29/97	Miller et al.	435	69.l	
	5,723,286	03/03/98	Dower et al.	435	5	
	5,723,323	03/03/98	Kauffman et al.	435_	172.3	<u> </u>
	5,733,743	03/31/98	Johnson et al.	435	69.1	
	5,763,192	06/09/98	Kauffman et al.	435	7.1	
	5,780,225	07/14/98	Wigler et al.	435	6	
	5,314,476	09/29/98	Kauffman et al.	435	69.1	
	5,817,483	10/06/98	Kauffman et al.	435	69.1	
	5,824,514	10/20/98	Kauffman et al.	435	91.1	

Form PTO-1449		
	SERIAL NO. 10/738,454	FILING DATE December 16, 2003
APPLICANT Wittrup et al.		GROUP 1645

	5,837,500	11/17/98	Ladner et al.	435	69.7	
	5,858,657	01/12/99	Winter et al.	435	6	
	5,866,344	02/02/99	Georgiou	435	7.21	
	5,871,974	02/16/99	Huse	435	69.7	
-	5,900,476	05/04/99	Ruggeri et al.	530	380	
	6,027,910	02/22/00	Klis et al.	435	41	
	6,114,147	09/05/00	Frenken et al.	435	69.7	

FOREIGN PATENT DOCUMENTS

Document Number	Date	Country	Class	Subclass	Translation Yes/No
WO94/18330	08/18/94	PCT			
WO94/01567	20.01.94	PCT			
WO98/49286	05.11.98	PCT			
0 436 597 BL	02.04.97	FP			

OTHER PRIOR ART (including Author, Title, Date, Pertinent Pages, etc.)

OTHER	PRIOR ART (including Author, Title, Date, Pertinent Lages, etc.)
	Alam et al., (June 1996), "T-cell-receptor Affinity and Thymocyte Postive Selection," Nature 381:616-620
	Anand, R. et al. (1992), "Progress in developing methylotrophic yeasts as expression systems," <i>TIBTECH</i> 10:413-417
	Bentley, G.A. and Mariuzza, R.A., (1996), "The Structuse of the T Cell Antigen Receptor." Annu. Rev. Immunol. 14:563-590
	Boder E.T. and Wittrup, K.D. (1997), "Yeast surface display for screening combinatorial polypeptide libraries," <i>Nature Biotechnol</i> . 15:553-557
	Boder, E.T. and Wittrup, K.D. (1995), "A Yeast Surface Display System for in vitro Affinity Maturation of Antibodies," <i>Protein Interactions</i> , June 1-4, 1995, Beckman Institute, University of Illinois, Urbana, (Abstract Only)
	Buckholz, R.G. and Gleeson, M.A.G. (1991), "Yeast Systems for the Commercial Production of Heterologous Proteins." <i>Bio/Technol</i> . 9:1067-1072

Form PTO-1449		
ATTY DOCKET NO. 97-99E	SERIAL NO.10/738,454	FILING DATE December 16, 2003
APPLICANT Wittrup et al.		GROUP 1645

ORIGINAL	LLY CITED IN 09/724,108
	Bjorkman, P.J., (Apr 1997), "MHC Restriction in Three Dimensions: A View of T Cell Receptor/Ligand Interactions," <i>Cell</i> 89:167-170
	Clackson et al., (Aug 1991), "Making Antibody Fragments Using Phage Display Libraries," Nature 352:624-628
	Cregg, J.M. et al. (1993), "Recent Advances in the Expression of Foreign Genes in <i>Pichia pastoris</i> ," <i>Bio/Technol</i> . 11:905-910
	Faber, K.N. et al. (1995), "Review: Methylotrophic Yeasts as Factories for the Production of Foreign Proteins," <i>Yeast</i> 11:1331-1344
	Fremont et al., (1996), "Biophysical Studies of T-cell Receptors and Their Ligands," Curr. Opin. Immunol. 8:93-100
	Hawkins, R.E. et al. (1992), "Selection of Phage Antibodies by Binding Affinity Mimicking Affinity Maturation," <i>J. Mol. Biol.</i> 226:389-896
	Hawkins, R.E. et al. (1993), "The Contribution of Contact and Non-contact Residues of Antibody in the Affinity of Binding to Antigen," J. Mol. Biol. 234:958-964
	Jung, S. and Plückthun (1997), "Improving in vivo folding and stability of a single-chain Fv antibody fragment by loop grafting," Protein Eng. 10(8):959-966
	Kieke, M.C. et al. (1997), "Isolation of anti-T cell receptor scFv mutants by yeast surface display," <i>Protein Eng.</i> 10(11):1303-1310
	Klis, F.M. (1994), "Review: Cell Wall Assembly in Yeast," Yeast 10:851-869
	Knappik, A. and Plückthun, A. (1995), "Engineered turns of a recombinant antibody improve its in vivo folding," Protein Eng. 8(1):81-89
	Lipke, P.N. and Kurjan, J., (Mar 1992), "Sexual Agglutination in Budding Yeasts: Structure, Function, and Regulation of Adhesion Glycoproteins," <i>Microbiological Reviews</i> pp. 180-194
	Lyons et al., (July 1996), "A TCR Binds to Antagonist Ligands with Lower Affinities and Faster Dissociation Rates Than to Agonists," <i>Immunity</i> 5:53-61
	Margulies, D.H., (June 1996), "An Affinity for Learning," Nature 381:558-559
	Marx, J. (Jan 1995), "The T Cell Receptor Begins to Reveal Its Many Facets," Science 267:459-460

Form PTO-1449		
ATTY DOCKET NO. 97-99E	SERIAL NO. 10/738,454	FILING DATE December 16, 2003
APPLICANT Wittrup et al.		GROUP 1645

ORIGINA	LLY CITED IN 09/724,108
	Matsui et al., (Dec 1991), "Low Affinity Interaction of Peptide-MHC Complexes with T Cell Receptors," Science 254:1788-1791
	Matsui et al., (Dec 1994), "Kinetics of T;cell Receptor Binding to Peptide/IEk Complexes: Correlation of the Dissociation Rate with T-cell Responsiveness," Proc. Natl. Acad. Sci. USA pp. 12862-12866
-	Nieba, L. et al. (1997), "Disrupting the hydrophobic patches at the antibody variable/constant domain interface: improved <i>in vivo</i> folding and physical characterization of an engineered scFv fragment," <i>Protein</i> Eng. 10(4):435-444.
	O'Herrin et al., (Oct 1997), "Analysis of the Expression of Peptide-Major Histocompatibility Complexes Using High Affinity Soluble Divalent T Cell Receptors," J. Exp. Med 186:1333-1345
	Reich et al., (June 1997), "Ligand-specific Oligomerization of T-cell Receptor Molecules," <i>Nature</i> 387:617-620
	Ridder, R. et al. (1995), "Generation of Rabbit Monoclonal Antibody Fragments from a Combinatorial Phage Display Library and Their Production in the Yeast <i>Pichia pastoris</i> ," <i>Bio/Technol</i> . 13:255-259
	Romanos, M. (1995), "Advances in the use of Pichia pastoris for high-level gene expression," Curr. Opinion in Biotechnol. 6:527-533
	Romanos et al., (1992), "Foreign Gene Expression in Yeast: a Review," Yeast 8:423-488
	Schlueter et al., "Specificity and Binding Properties of a Single-chain T Cell Receptor," J. Mol. Biol. 256:859-869
	Schreuder et al., (Apr 1996), "Immobilizing Proteins on the Surface of Yeast Cells," TIBTECH 14:115-120
	Schodin et al., (1996), "Binding Properties and Solubility of Single-chain T Cell Receptors Expressed in E. Coli," Molec. Immunol. 33:819-829
	Sudbery, P.E. (1994), "The Non-Saccharomyces Yeasts," Yeast 10:1707-1726
	Syrulev et al., (Dec 1995), "The Law of Mass Action Governs Antigen-stimulated Cytolytic Activityof CD8+ cytotoxic T Lymphocytes," <i>Proc. Natl. Acad. Sci. USA</i> 92:11990-11992

Form PTO-1449		
ATTY DOCKET NO. 97-99E	SERIAL NO. 10/738,454	FILING DATE December 16, 2003
APPLICANT Wittrup et al.		GROUP 1645

	Ulrich et al. (Dec 1995), "Expression Studies of Catalytic Antibodies," Proceed. Natl. Acad. Sci. 92:11907-11911
	van der Vaart (Sept 1965), "Identification and Characterization of Cell Wall Proteins of Saccharomyces ceevisiae," Thesis, ISBN 90-393-1498-5 pp.1-138
-	Weber et al., (Apr 1992), "Specific Low-affinity Recognition of Major Histocompatibilty Complex Plus Peptide by Soluble T-cell Receptor," Nature 356:793-796

EXAMINER

DATE CONSIDERED

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

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M.P. Schreuder et al, Yeast expressing hepatitis B virus surface antigen determinants on its surface: implications for a possible

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)

Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

oral vaccine, Vaccine 1996 Volume 14 Number 5 383.

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Application/Control No. 99/724,108 Application/Control No. 99/724,108 Cassification/Control	<i>,</i> ,,	SUBMITTED IN 10/738,454					- Applicants Copis		
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P Q R S T NON-PATENT DOCUMENTS * Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) U Boder et al., Immunotechnology, 1996, Vol. 2(4), p. 283, "Yeast surface display system for antibody engineering", Abstrapper presented Feb. 22-28 1996. V W	*		· ·	MM-YYYY	Country	Na	me	Classification	
P Q R S Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) Boder et al., Immunotechnology, 1996, Vol. 2(4), p. 283, "Yeast surface display system for antibody engineering", Abstrapper presented Feb. 22-28 1996. V W		<u> </u>		ļ			·	· · · · · · · · · · · · · · · · · · ·	
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NON-PATENT DOCUMENTS * Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) Boder et al., Immunotechnology, 1996, Vol. 2(4), p. 283, "Yeast surface display system for antibody engineering", Abstrapaper presented Feb. 22-28 1996. V W		ļ							
NON-PATENT DOCUMENTS Non-Patent Documents	<u></u>	<u> </u>		<u> </u>					
NON-PATENT DOCUMENTS * Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) Boder et al., Immunotechnology, 1996, Vol. 2(4), p. 283, "Yeast surface display system for antibody engineering", Abstrapaper presented Feb. 22-28 1996. V W		R			 				
NON-PATENT DOCUMENTS Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) Boder et al., Immunotechnology, 1996, Vol. 2(4), p. 283, "Yeast surface display system for antibody engineering", Abstrapaper presented Feb. 22-28 1996. V W	<u> </u>	S							
* Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages) U Boder et al., Immunotechnology, 1996, Vol. 2(4), p. 283, "Yeast surface display system for antibody engineering", Abstrapaper presented Feb. 22-28 1996. V W		Т				1			
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*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)

Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.